

The Canadian Entomologist.

VOL. XXVII.

LONDON, JANUARY, 1895.

No. 1.

TO A. R. GROTE.

Lover of Night, in other lands than mine,
Of night made mystical by many a sprite
And bashful woodland fancies, made divine
By the moon's shining and the still starlight.

I greet thee, my twin Spirit. Tell thy tale
More often to thy listeners over seas :
Tell how the shadows brood o'er hill and vale :
Tell how the voices whisper on the breeze.

Call forth thy spectres robed in gauzy light,
Thy shadowy Indians and thy old-world fays.
So shall the Old World and the New unite
On Nature's bye-paths and Night's silent ways.

And when one day the still procession moves
To seek those realms that men call Heaven and Hell,
We twain may steal an hour, if none reproves,
To watch the Moths in meads of asphodel.*

G. M. A. HEWETT,
St. Winefride, Winchester, England.

AUGUSTUS RADCLIFFE GROTE.

We have great pleasure in presenting, with the first number of a new volume, the accompanying likeness of our much esteemed friend and constant contributor, Mr. A. R. GROTE, A. M., of Bremen, Germany. His name is familiar to every reader of the CANADIAN ENTOMOLOGIST, to which he began to contribute in 1870, when it was in its second volume, and his work is known and valued by every student and collector of North American Lepidoptera. We wish him, and all our friends and correspondents, a very happy and prosperous New Year. C. J. S. B.

*Printed in the Entomologist's Record and Journal of Variation, March 15th, 1894, page 76.

THE GENERA IN THE NOCTUIDÆ.

BY A. R. GROTE, A. M., BREMEN, GERMANY.

It must be conceded that there is a want of correspondence between authors as to the generic names employed in the *Noctuidæ*; perhaps a greater than in other families of Lepidoptera. The main cause appears to lie in the two systems of classification. The old system, under which the species were assorted into genera from their superficial characters, found its highest expression in the works of Guenée. The new system, commenced by Stephens and Lederer, deals with the ultimate structure of certain parts, and is yet working out its results in the direction which all systems must pursue, that of perfectly reflecting in our books the order which obtains in nature itself. To this end the new system must extend itself, and is extending itself, witness the work of Packard and Dyar, to a study of the insect in all its stages. Here a narrow insistence on any one character must defeat the general aim.

The want of correspondence above spoken of in the generic titles of the *Noctuidæ* is, then, greatly owing to the different systems which underlie the arrangement. Perhaps, in the one case, I ought to say the want of system. While, in the butterflies, there exists a more distinctly expressed correspondence between superficial characters, form, colour, pattern, size, and structural characters, this correspondence is greatly wanting in the moths, where series of very similar appearing species are found to be structurally very different. While, then, ancient and modern genera in the butterflies more nearly cover each other, and the generic types are more easily fixed upon as a whole, there is a wider divergence in the *Noctuidæ*. For instance, I will take the genus *Xylena*, Hübn., Tent. The type and sole species (therefore the type) of this genus is *X. lithoxylea*. This insect belongs to Stephens's later genus *Xylophasia*, a genus recognized variously as either distinct from or as a group of *Hadena*, or, again, as not being really separable by valid characters. The genus *Xylena*, Hübn., 1806, is then, a *Hadenoid* genus, proposed for a *Hadenoid* species. In 1816, Ochsenheimer, 4, 85, adopts the spelling and cites Hübner for the genus *Xylena*. But now comes the old system, and Ochsenheimer arranges 30 species under his genus *Xylena*, most of them strongly dissonant in structure. The modern system separates Ochsenheimer's species of *Xylena*, and breaks up his genus under some 12 different genera, and places these in different groups up and down in the family. The type of *Xylena* (*lithoxylea*) is also included by Ochsenheimer, and,

for his species, the genera *Lithomia*, *Calocampa*, *Lithophane*, *Hadena*, *Xylena*, *Actinotia*, *Dipterygia*, *Chariclea*, *Calophasia*, *Asteroscopus*, *Scotochrosta*, and yet others are now used. Unfortunately the generic title, becoming altered in spelling to *Xylina*, has been retained for the Lithophanoid forms, instead of the Hadenoid form, for which it was intended and to which it properly belongs. This mistake I set right in 1876; I show that *Xylophasia* is a synonym of *Xylena*, and that for the genus *Xylina* of authors the name *Lithophane* (1816) must be used. Only through such researches can we arrive at the certain titles of our genera, and if we would one day reach a stable nomenclature, if our aim is fixity and not laxity, the result of such studies must be adopted and held fast.

The type of each genus in the *Noctuide* should clearly be first positively ascertained, and the structural features of such type fully exposed. By comparison we can then group around such types the other species. We can ascertain the reasonable limits of the genera, weigh the characters of outlying forms which obscure these limits, and, through comparative studies in all stages, arrive at that condition of affairs in classification where a certain generic term covers a certain total structure, and its use calls up a picture of the greatest number of ascertained facts. The time will then come when the present personal, opinionative use of generic terms will give way to the scientific, impersonal one, when authority will no longer usurp the place of reason and research.

Acting again unfavourably upon the attainment of such a state of affairs in literature and conversation, is the tendency to make a difference, where in reality none exists, between authors as to the validity of their names arising from the alleged want of technical completion of publication. I am here concerned only with generic titles. I hope to show elsewhere that specific titles owe their recognition to a correspondence between the object and the published description, and that, where the supposed "type" of the original describer contradicts at all essentially the original text, the "type" must be considered spurious, since the reason for the name is to be found in literature, not in a labelled specimen. In generic titles we are, however, solely concerned with literature, because generic titles deal almost exclusively with already described species as a matter of fact. New genera, based only on new species, depend also largely upon the proper identification of the species, but these instances do not affect the older generic titles and play no part in our present investigations.

The difference made between authors, to which I above allude, as to generic names, is, that catalogue names, to which no description is appended, but under which the species are simply listed, are held to be of less value. But we can always know what is meant by them, and all that we seek in the present case is to find out an exact generic title for any one species as an impersonal literary fact. In an opposite view no criterion exists by which we can test the description. Almost all the older descriptions, so far as matter is concerned, are waste paper. Take for instance the cases of Walker and Hübner. Walker's generic descriptions in the *Noctuidæ* contain statements out of which we can usually make nothing. Take, for instance, that of *Feltia*. What is said would cover almost any of the entire *Noctuinae*. The synonyms made by Walker would not and could not have been detected unless I, or some one else, had inspected his type. Had any one told him that his *Feltia ducens* was a specimen of *Agrotis jaculifera*, Guen. (= *subgothica* of Authors nec Haworth), Walker would have been obliged for the information, and simply thrown his label and MS. into the waste paper basket, where both rightly belonged. The real difference between Walker and Hübner is, that Walker says more and conveys little, while Hübner says little and conveys more. Practically we can never be at a loss for the proper use of a single generic title published by Hübner, so that under the law of priority we can properly refer all of them, without, as is often the case with Walker, first having to identify a badly described species. Where both authors propose genera for known species, there is in reason no difference to be made between them. Walker's diagnoses are generally no better than no description at all; not unfrequently are they positively misleading.

Leaving these two authors, we come to Ochsenheimer, and here the fact presents itself that Ochsenheimer's names which did not meet the adverse fate of Hübner's in the Tentamen, are also no better founded, and are "catalogue names" without a description. What sort of a description could Ochsenheimer indeed have given? So that several names now in use and never doubted have the same original right as Hübner's Tentamen names. I think this fact ought to lend my argument conclusive weight, added to the fact, proven by me, that Ochsenheimer adopted Hübner's names, and considered the Tentamen as properly published and as of authority. Ochsenheimer apologizes, in fact, for not having adopted more of Hübner's titles, because the sheet of the Tenta-

men had not reached him earlier. Probably some of the opposition to Hübner had its origin in the prejudice against a multiplicity of genera. With all such matters of feeling science has nothing to do in its impersonal researches after an exact generic nomenclature. What we seek is a stable name for certain generic types of structure, not a choice between authorities.

All who have studied the recent progress in the classification of our North American Noctuidæ, will recognize the fact that it is being carried out upon the lines laid down by me in the pages of this journal, lines which I took up from the writings of Stephens and Lederer on the Old World fauna and applied to the arrangement of the North American species. The new catalogues adopt my groupings. Here and there my reference of a species to a wrong genus, from a neglect to examine the single type, having no microscope at hand, or from a fear of injuring it before its return, is corrected—some half a dozen—but, as a whole, the species remain as I arranged them, and what changes are made are the natural result of observations on larger material, and, in any event, more apparent than real. That our classification can be bettered is certain. No one lifetime is long enough, outside of other occupation, to finally study our nearly 2,000 species of owlet moths and make all the comparisons necessary with the European and South American faunæ. It is hardly necessary for me to say this in the way of apology for the incompleteness of my work. All our work is fragmentary and incomplete. This fact is often forgotten, usually forgotten by new or younger writers, as also that all undue and unjust criticism will tell in the end against the user of such a weapon. Underlying all our entomological activities is the individual person, the more or less educated character, the mental force which time and opportunity develops and cultivation softens and perfects. Even in our very nature itself we are dual; our actions are not always in accordance with our conceptions. I am reminded of this fact by an interesting statement of Prof. J. B. Smith's, who testifies to this duality (Proc. National Mus., XIV. 207) where he acknowledges that he had redescribed my *Mamestra purpurissata*, which has hairy eyes, as a species of *Hadena*, in which genus the eyes are naked. Prof. J. B. Smith says (l. c.): "How I came to refer the insect to *Hadena*, I can not now understand, since my memoranda show that I *knew* the eyes were hairy."

Here is, then, the place for me to correct a former citation (with regard to *Noctuid* genera) of mine in the Buffalo Check List, 1876. Hübner is

the first to restrict the use of the name *Gortyna* to the species *micacea*. His action makes it obligatory upon us to keep this type for *Gortyna*, and Guenée's name *Hydræcia*, proposed for the same identical type, must, as I have always insisted, fall. But, in my Buffalo Check List, I give the Tentamen, instead of the Verzeichniss, as authority. The fact is not in any way changed by my mistake in the citation. The citation is, thus, properly: "*Gortyna*, Hübn., Verzeichniss, 1816, 232, *micacea*, only species and therefore type." But Ochsenheimer's work has, although of the same dating (1816), priority; since I understand the Verzeichniss was not published completely in 1816, and Hübner probably took the name from Ochsenheimer, who does not cite Hübner. So we must call the genus *Gortyna*, Ochs., 1816, with the type *micacea*, as restricted by Hübner. The rest of my citation is correct; but again, at the close, under *Ochria*, I have fallen into the mistake of saying that this name is proposed for *flavago*, alone, in the Verzeichniss. This error probably arose because *flavago* is mentioned by itself at the top of Hübner's page 234, and I overlooked the fact that, on page 233, he has two more. Again, this mistake does not alter my statement that we must use *Ochria* for the type *flavago*. Hübner's first species is a *Xanthia*; Guenée has taken out the second as the type of his genus *Dicycla*; there remains for *Ochria*, then, *flavago* ALONE. We must reverse (as I have done) the terms proposed by Lederer for these genera. While it is proverbially human to err, it is a wise dispensation of Providence that out of all our errors there comes light—if not for us, then for those who come after us.

LECANIUM FLETCHERI, CKL.

In the September (1893) number of the CANADIAN ENTOMOLOGIST, page 221, Mr. T. D. A. Cockerell described under the above name a *Lecanium* found at Ottawa upon an ornamental cedar on the Experimental Farm. Only a few specimens were found at that time upon three or four bushes of a shrub which we have under the name of *Thuja Sibirica*. About the middle of last June, when at Stittsville, Ont., 15 miles from here, I found a few more specimens of this species upon the native cedar (*Thuja occidentalis*). The shrubs upon which the first specimens were found were originally imported from France six years previously, and there was, of course, the possibility that the scale insect, although of an undescribed species, might have been imported with it and overlooked. As it has now been found, however, and in larger numbers, some miles from here, upon our native "White cedar," there is no longer any doubt that it is indigenous.

J. FLETCHER, Ottawa.

THE AMERICAN SPECIES OF PERINEURA.

BY ALEX. D. MACGILLIVRAY, ITHACA, N.Y.

The Abbe Provancher described two species of *Synairema* from North America, one from the Atlantic region and one from the Pacific region; a second species, from the Pacific region, is described below. The genus *Synairema* is considered as a synonym of *Perineura*, by Kirby.

1. The face, thorax, and legs marked with white . . . *americana*, Prov.
The face, thorax, and legs black 2.
2. The posterior tibia wholly black *pacifica*, Prov.
The posterior tibia annulated with white *Kincaidia*, sp. nov.

Perineura americana, Prov.—♀ “Black; face below the antennæ, inner orbital lines reaching the occiput and thence curving inwards, mandibles, clypeus, palpi, genæ, scape underside, a spot on each side of the median lobe of mesothorax, a spot on tegulæ, scutel, a point before and another one behind, apex of basal plates, pleura and pectus in parts, white. Antennæ long, slender, black, with a white spot on the scape underneath. Wings hyaline, nervures and stigma brown-black. Legs white, including coxæ and trochanters, the two anterior pairs with a black line exteriorly on their femora, tibiæ and tarsi; the posterior pair black, with coxæ, except a black spot outside, trochanters and basal third of femora, white; the spines of their tibiæ, except the tips, and a ring at the base of the first joint of the tarsus, also white. Abdomen elongated, black, shining, venter more or less whitish on the sides. Valves of the terebra black, shortly exerted.”

Length, .46 inch.

Habitat, Cap Rouge, P. Q., Canada.

Perineura pacifica, Prov.—♀ Black with the abdomen red. The head, thorax, feet, black without spots. Wings moderately smoky, the lanceolate cell contracted at middle, the costa and stigma black. Abdomen cylindrical, robust, red, with the first segment black, and a black spot, poorly defined, on the terminal segment. Length, .35 inch. (Translation.)

Habitat, Vancouver Island.

Perineura Kincaidia, n. sp.—♀ Black; the labrum at apex slightly ferruginous; the abdomen beyond the first segment ferruginous; the lateral sheaths of the ovipositor black; the apex of the anterior femur and the front side of anterior tibia, fuscous; the mandibles spotted with white; the posterior tibia above on apical third with a white band; the

inner spur of the anterior tibia stout, broad, bifurcate at apex; the outer spurs of the anterior tibia and those of the middle and posterior tibiae long, slender and simple; antennae stout, thicker at apex, the third segment one-third longer than fourth; clypeus deeply emarginate; wings smoky, darker at base; stigma and costa black; the marginal cross-vein originating in the lower posterior angle of the stigma, and joining the third submarginal cell at the end of the second third; posterior wings with two middle cells; the lanceolate cell much shorter than the submedian cell. Length, 10 mm.

Habitat, Olympia, Washington. 4 ♀♀, May 28, July 2. Trevor Kincaid, collector.

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Habitat, Canada.

Kincaidia, sp. nov.

Habitat, Olympia, Washington.

Pacifica, Prov.

1886. *Synairema*, Provancher, Faun. Ent. Can. Suppl., II., 15.

1887. *Synairema*, Cresson, Trans. Amer. Ent. Soc. Suppl., 169.

Habitat, Vancouver Island.

*The lanceolate cell is said to have an oblique cross-nervure, and *Synairema* to have this cell closed in the middle.

COLEOPTERA OF LAKE WORTH, FLORIDA.

BY ANNIE TRUMBULL SLOSSON, NEW YORK.

I was much interested in Dr. Hamilton's paper on Lake Worth Coleoptera (CAN. ENT., XXVI., 250). I spent twelve days at Palm Beach, Lake Worth, last spring, and did a little collecting. I took 57 species of Coleoptera between March 9th and 21st. Of these, 36 are not included in Dr. Hamilton's list. I append the names of these, and add a few notes. I am indebted to Mr. Chas. Lubeck for identifications.

Casnonia ludoviciana, Sallé.

Apenes sinuata, Say.

Chlœnius niger, Rand.

Selenophorus palliatus, Fab.

" *iripennis*, Say.

" *gagatinus*, Dej.

Philhydrus nebulosus, Say.

" *cinctus*, Say.

Staphylinus tomentosus, Grav.

Olibrus princeps, Sz.

Languria marginipennis, Sz.

Cicones lineaticollis, Horn.

Psammœcus Desjardinsi, Guer.

Hister abbreviatus, Fab.

" *defectus*? Lec.

Cyphon padi, Linn.

Photuris frontalis, Lec.

Dinoderus porcatus, Lec.

Onthophagus hecate, Panz.

Aphodius vestiaria, Horn.

Criocephalus obsoletus, Rand.

Elaphidion truncatum, Hald.

" *parallellum*, Newm.

Leptostylus aculiferus, Say.

Lypsimena fuscata, Lec.

Spalacopsis suffusa, Newm.

Edionychis thoracica, Fab.

Odontota bicolor, Oliv.

Coptocycla auricalcea, Fab.

Sitophagus pallidus, Say.

Blapstinus fortis, Lec.

" *estriatus*, Lec.

Alphitobius piceus, Oliv.

Pteniopus Murrayi, Lec.

Lixus lævicollis, Lec.

Cryptorhynchus bisignatus, Say.

I found but one specimen of *Casnonia ludoviciana*. It was in the sand at the roots of a species of *Crotalaria*, near ocean beach. *Selenophorus iripennis* was very common under boards and rubbish just back of the hotel. Several specimens of *Philhydrus nebulosus* flew into my room at night. *Staphylinus tomentosus* was found under decaying cabbage leaves in garden patches. What I now suppose to be the *Belonuchus formosus*, var. of Dr. Hamilton's list, was plentiful in situations similar to those he mentions, "under damp rubbish" and decaying vegetation. *Photuris frontalis* was the only "firefly" I saw, coming about piazza of hotel and into the rooms. On the white sand near ocean beach, in the sparse and scattered semi-tropical vegetation, several species were constantly found in great profusion. Among these, *Blapstinus estriatus*, was perhaps the most common, and could be taken by hundreds. With it was always found a hemipter, *Corimelana*, sp.; so like its coleopterous companion superficially, that I at first, in gathering them quickly into my bottle, did not detect the difference, but the characteristic odour soon betrayed them. In the same situations *Mecynotarsus elegans* occurred in great numbers. Dr. Hamilton's allusion to their presence on "sand, hot enough to blister," appeals to me forcibly. I never saw, or felt, anything so scorching. I also noticed the tiny ant found in their company, and so like them in general appearance and habit; and wrote of it to Mr. Lubeck. He finds *Mecynotarsus candidus* on sandy places in New Jersey, but says nothing of any ant as associated with it. *Pteniopus Murrayi* flew to light in the evenings, and I took at least two or three every night. On the wall of my bedroom one evening, I captured two specimens of the little weevil, *Cryptorhynchus bisignatus*, and this summer I took the same species on the summit of Mt. Washington!

GENITALIC CLASSIFICATION.

BY REV. GEO. D. HULST, BROOKLYN, N. Y.

In the August number of the CANADIAN ENTOMOLOGIST, Vol. 26, p. 215, under the subject "An Omitted Phycitid," Mr. Grote speaks disparagingly of my having established a subfamily upon differences in genitalic structure, and says: "Messrs. Scudder and Burgess first gave us genitalic species; Lederer used the genitalia for subgeneric and generic divisions, and latterly is followed by Smith. Now comes Mr. Hulst, whose mission seems to be to carry out the methods of other entomologists to extremes, and give us genitalic subfamilies."

So far as the above touches upon science I wish to speak.

There are only two questions to answer in defense of the use of genitalic characters in classification: the one,—Is the method scientific? and the other,—Is it warranted in the case under discussion?

First,—Is it scientific? The structure of the genital organs belongs to those phases of structure ordinarily known as secondary sexual characters. These all stand in the same category in classification. If one can be used, another may be, and may be of equal value. But from the beginning systematists have made abundant use of such of these characters as were known to them, for not only subfamily, but even higher divisions. For example, in the paper of Mr. Grote, referred to above, he says: "In 1878 I separated the *Epipaschiinæ* (*Epipaschiæ*) from the *Phycitinæ* (*Phycidæ*). The two groups I regard as divisions of the *Pyalidæ*, equal in value to the *Crambinae* and *Galleriinae*." These are one step higher than the division I made based upon the genitalia. But Mr. Grote's division was based upon a secondary sexual character, the presence of a peculiar development on the basal segment of the male antennæ. I conclude, therefore, it is scientific to make use of any secondary sexual character. The use of the structure of the genitalia in classification is therefore scientific. But to be of scientific importance, and properly used, structural characters must be so permanent that their variations can be relied upon. Is this true with the genitalia? It can, I think, be affirmed, that no other secondary sexual character can be so confidently relied upon. The universal testimony of those who have made a study of genital structure is entirely in accord with this truth. One can with more absolute certainty, where there is variation, tell an insect by the genital structure, than by any other—often all other means.

But, secondly,—Is the use of genital structure warranted in the case under discussion? Of course all distinctions in classification are to an extent artificial, and a matter of opinion; but we will probably all agree that for family or subfamily distinction there ought to be not a simple difference in structure, but in the *type* of structure. If there be a typical difference, the distinction may be made even though intergrades exist. For example, so far as the antennal process is concerned, the *Epipaschiina* grade insensibly into the *Phycitina*. But, as the structure is very peculiar, they may properly be separated. In the *Phycitina*, Mr. Ragonot bases a separation upon the tongue. His basis, however, is not one of type, but of degree, with all intergradations existing, and therefore should not be allowed for anything higher than genera. But the genital structure is of two radically different types, sharply distinct, and so far as I know (and I have examined almost every American species), without any tendency to intergrade; subfamily distinction is therefore fully warranted.

I do not stand alone in this my opinion. I think there will be no question there is no one living better able to give a judgment in the case, or more honest in his utterance of judgment at all times, than Prof. Fernald. In a notice of my monograph of the "*Phycitidae* of N. A.," CAN. ENT., Vol. 22, p. 191, Prof. Fernald says: "Mr. Hulst divides the family into two subfamilies, based on the presence or absence of the lower anal plate, and differs from Ragonot, who divides them on the development of the tongue; from my own studies I am inclined to agree with Mr. Hulst."

After writing the above, I wrote to Prof. Fernald, indirectly asking his present views upon this subject. His answer I have his permission to use as I please. I therefore quote a considerable part of it, which directly bears upon the subject before us, and which also gives a considerable amount of very interesting history upon the bringing into light of the structure of the genitalia as a prime factor in classification.

Prof. Fernald says in part: "In 1877 I began my studies of the *Tortricidae*, at the suggestion of Mr. Grote. In 1880 I read a paper before the Entomological Club, at the Boston meeting of the American Association for the Advancement of Science, in which I stated that I was able to separate the subfamilies of the *Tortricidae* by means of the genitalia. I had prepared and studied the genitalia of a large number of species, and also of individuals under the species. I showed at that meeting a large number of drawings made from the objects by means of

the camera. In these studies I found characters by means of which I could separate the species ; others which separate the genera ; and still others which separate the subfamilies, or families, as some call them. As the Club was not a part of the American Association, the paper was not published, nor has it ever been published, though many of our prominent entomologists were present and heard my paper."

" Mr. Meyrick, in his Descriptions of New Zealand Microlepidoptera, Phil. Inst. of Canterbury for 1884, p. 141, after giving a recasting of his definition of the *Tortricidæ* and *Grapholithidæ*, says: 'I am indebted to Professor Fernald, well known as a special authority on this group, for the information on which this change is founded. He states that the genital uncus never occurs in the *Grapholithidæ*, and considers that such genera as *Ctenopseustis*, hereafter described, should be therefore referred to the *Tortricidæ*; which amounts to saying, that the possession of the uncus is a more valuable systematic character than the possession of the basal pectination (of the median fold of the hind wing). As Professor Fernald has devoted much labour to the investigation of material from all parts of the world, there is little doubt that he is correct, and I have adopted his suggestion. I have not yet found leisure to examine the genitalia of all the *Tortricina* of this region, but I have investigated a few species, which appear to confirm his views; and in the case of the *Pyralidina*, I have found the same character valuable for family separation.' " " In the same paper, page 146, Mr. Meyrick establishes the genus *Ctenopseustis* for Walker's *Pedisca obliquanz*, and under it says: 'Professor Fernald assures me that the genital uncus of the male (the value of which as a divisional character he was the first to discover in this group) is never developed in the *Grapholithidæ*, and that this species should be included in the *Tortricidæ*, notwithstanding the pectination of the lower median vein, this latter structure being indeed also found in *Oenectra*, which is certainly referable to the *Tortricidæ*. In this view I quite concur, and therefore place the species here, which involves the formation of a new genus for its reception.' "

" I write this to show why I could speak so confidently of the value of your classification of the Phycids."

It will thus be seen that my use of the genitalia in classification, while independent of, because I was ignorant of, the work of Prof. Fernald and Mr. Meyrick, was far from being original in time or in inception. Prof. Fernald was the pioneer in the work, and to him belongs the greater guilt,

if guilt there be, and the greater, if not all the praise, if praise be merited, as I most emphatically believe it is.

But in view of all that is above, it will, I think, appear that my distinction in the *Phycitidae* is warranted. Genitalic differences may be used in classification, and when the type of structure is different, may be used for distinctions higher than genera, and finally, that no ordinary differences in elemental structure afford a better basis for classification.

This is all written upon the assumption that the form of the genital organs is a *secondary* sexual character. Some of our best systematists regard this structure as a *primary* sexual character. Prof. J. B. Smith is of this opinion, and his opinion is of the highest value. In that case the value of the structure of the genitalia in classification is much increased, and family distinction based upon it is the more fully warranted.

NOTES ON CARAMA AND OTHER MEGALOPYGIDÆ.

BY HARRISON G. DYAR, A. M., NEW YORK.

Recently, I was informed by a friend that he had a Carama from Washington, D. C. I naturally expected to see *C. cretata*, Grt.; but the specimen now before me proves to be *Carama pura*, Butl. This raises the question of the validity of the specific characters used in the genus. Caramas are rare in the United States, and it seems scarcely probable that we have more than one species. Mr. Baker, in his review of Carama, does not refer to *cretata*, Grt., though it is the fourth name in point of priority. It is evident from his synopsis, however, that *cretata* differs from *ovina*, Sepp., only in having the yellow colour confined to the vertex of the head, and from *discrepans*, Wall., in its smaller size and white front.

I am of the opinion that these characters are nothing but individual variations, and I think we shall be safe in adopting the following synonymy. Probably several other names must come in, but I will go no further at present than the specimens before me seem to warrant.

CARAMA OVINA, Sepp. (front pale.)

cretata, Grote.

var. VIRGO, Butl. (front dark.)

pura, Butl.

In the revision of North American "*Bombyces*," by Mr. Neumögen and myself, we include the genera *Dalcerides* and *Eupoeya* among the

Megalopygidæ (Lagoidæ). We recognized that the former did not belong here; but it seems nearer this family than any other, and was so placed, pending further study of the South American fauna, when it will probably find place in a new family.

As to Eupoeya, I am inclined to believe that it belongs to the Megalopygidæ, though the branching of the radial nervules of primaries is rather unlike the typical form, and Dr. Packard's figures do not show a branch to vein 1.

I find that *Sciathos punctigera*, Linn., belongs to the Megalopygidæ (Kirby's Cat., p. 540, next to Sibine in the Limacodidæ).

The genera so far shown to belong to this family separate as follows:—

Vein 7 arising nearer base than 9. *Eupoeya*, Pack.

Vein 7 arising beyond 9.

Vein 10 from a stalk.

Veins 3-4 of secondaries stalked. *Carama*, Walk.

Veins 3-4 of secondaries not stalked.

Vein 8 of secondaries united to 7 to outer third of cell. *Ochrosoma*, H. S.

Vein 8 united to 7 nearly to tip of cell. . . . *Sciathos*, Walk.

Vein 10 of primaries from the cell. *Megalopyge*, Hübn.

Eutheca (*Sapinella*, Kirby) *mora*, Grote.

Lord Walsingham has kindly sent me the following information:—

"An examination [of the type in the British Museum] shows it to be an Anaphorid with 12 separate veins in the forewings and eight in the hindwings. I can scarcely distinguish it from *Pseudanaphora arcanella*, Clem., of which it may be the ♀, which is unknown so far as I am aware." The name may be removed from the list of unidentified Bombyces, and the genera *Eutheca*, Grt., and *Sapinella*, Kirby, relegated to the synonymy.

CORRECTION.

In the list of Dragonflies of Corunna, Mich. (C. E. xxvi., p. 345, December, 1894), *Calopteryx apicalis*, Burm., should be *Calopteryx aquabilis*, Say.

D. S. KELLCOTT.

ON A NEW SCALE-INSECT FOUND ON PLUM.

BY T. D. A. COCKERELL, N. M. AGR. EXP. STA.

Some time ago, Prof. Gillette sent me a few specimens of an *Aspidiotus* found on plum at Cañon City, Colorado, 31st Aug., 1894. They occurred on the fruit itself. He had previously sent the species to Mr. L. O. Howard, who had written that it was apparently new. The material sent was not altogether satisfactory, owing to the fact that the insect occurs solitarily on the fruits, and has to be collected by slicing off bits of the skin. Consequently it is inconvenient to obtain it in quantity, and not very easy to nicely preserve those obtained: However, the discovery of a new *Aspidiotus* on plums in the United States was a matter of importance, and deserved the most careful consideration. It now appears, after some study and correspondence, that the species is really new, as at first supposed, and it may be introduced as follows:—

Aspidiotus Howardi, n. sp.

♀ scale circular, flat, about $1\frac{1}{2}$ mm. diam., pale greyish with a slight reddish tinge; exuviae sublaterai, covered; dull orange, secretion over exuviae easily rubbed off.

♀ broadly pyriform, orange; margin of terminal portion thickened, very finely striate, showing a violet colour in some lights. Plates spine-like, sparingly branched. Median lobes very large and prominent, close together but not contiguous, obliquely truncate, slightly crenate. Second pair of lobes small, broad and low. Third pair practically obsolete. There are conspicuous "wax ducts."

This species belongs to a series with circular or nearly circular ♀ scales; and more elongated, somewhat oval ♂ scales. The covered exuviae are orange or reddish, and easily exposed by rubbing. The median lobes of the ♀ are large, the others comparatively small, or obsolete. Such species are *A. perniciosus*, Comst., *A. ancylus*, Putn., *A. punicea*, Ckll., *A. ostraeformis*, Curt.

In *perniciosus*, one does not find the same array of plates as in *Howardi*, and there are the characteristic "incisions" between the lobes. Moreover, *perniciosus* always lacks the grouped glands.

Turning now to *ancylus*, we find a species with grouped glands when mature, but presenting also the "incisions" as in *perniciosus*. It has not, either, the same arrangement of plates as *Howardi*. *A. juglans-regiae* is clearly out of the question, by superficial appearance alone. The West

Indian *punica* differs clearly in the scale, and it will suffice to say, without further details, that *Howardi* is not identical with any known neotropical species.

Having thus satisfied ourselves that it is no known American species, nearctic or neotropical, we naturally turn to Europe. Is it *A. ostreaformis* of Curtis? I have examined *ostreaformis* from Isleworth, England, (Geo. Manville Fenn), on peach; also from Rouen, France (sent by Mr. Morgan). It is quite manifestly not *Howardi*, though in some respects like it; *ostreaformis* has the median lobes well notched without, the second lobes longer and narrower, a pair of curious tooth-like plates beyond, numerous orifices in the groups of ventral glands, etc. On the whole, *ostreaformis*, *perniciosus* and *ancylus* appear to be nearer to one another than either to *Howardi*.

Lichtenstein's *A. pyri* is presumably the *ostreaformis*, formerly confounded, as remarked, with a *Diaspis*. But he says the ♂ scale is rounded, whereas it is surely oval—at least in true *ostreaformis*, as in *Howardi*. As for other European species, I find none that will agree with our insect.

There is one other species of *Aspidiotus* that seemed very like ours, and that is *A. spinosus*, Comst., found on Camellias in the conservatory of the Dept. Agriculture at Washington, the original habitat being unknown. The food-plant suggests Japan, and when I noticed the resemblance to *Howardi* in this insect I was much interested, having already thought of the probability that our species came on Japanese fruit trees, the importation of which has lately become increasingly popular. Judging by Comstock's figure of *spinosus*, it might seem that they could not be the same; but the figure shows only one pair of lobes, the description giving second and third pairs, though stating that they are small.

At this point I should have been inclined to let the matter drop, or await further developments, but for the kindness of Messrs. Howard and Pergande, in Washington. Having put my difficulty to Mr. Howard, he turned the matter over to Mr. Pergande, who prepared the appended report. This report seems to indicate that Comstock's figure of *spinosus* is more correct than his description; but, in any case, it practically settles the difficulty as to the possible identity of *Howardi* with *spinosus*. I had not myself seen the grouped ventral glands in *Howardi*, but Mr. Pergande shows that they exist.

With regard to the name of the species, it is a pleasure to dedicate it to Mr. Howard, to whom we are so greatly indebted for information regarding parasites of Coccidæ.* The present species, *Howardi*, is infested by a dark brown Chalcidid parasite.

As to the origin of *A. Howardi*, nothing certain can yet be said, but it is still possible enough that it comes from Japan. At all events, horticulturists should be on the look-out for it, and some care should be exercised that it may not spread widely over the country. Attacking the fruit, it would surely interfere with their market-value, even if not seriously injuring the tree.

Mr. Pergande, on A. Howardi and A. spinosus.

"Examined and compared typical specimens of *Asp. spinosus* with *Asp. Howardi*, with the following results:—There can be no doubt that the two are distinct species. *A. Howardi* is considerably larger than *spinosus*; measuring 1 mm. in length [= adult ♀], whereas the largest one of *spinosus* is but 0.6 mm. in length.

"The anal segment of *A. spinosus* presents the following characters:—There is but *one pair of anal lobes visible*. The spines on either side of these lobes are numerous, more or less distinctly toothed, grouped closely together and occupying the terminal third of the segment. [These spines are the spine-like plates.]

"There are but 4 groups of spinnerets, of which the anterior pair of groups is composed of 2 to 5, and the posterior pair of 2 to 4 pores. *There appears to be but one row of more or less irregularly arranged, often quite indistinct, oval pores* between the groups of spinnerets and the lateral margin.

"In *Asp. Howardi*, of which I had but a single specimen for examination, there are *two pairs of well-developed terminal lobes*; while the spines are longer and stouter than in *A. spinosus*, they are also more scattered and cover about the posterior half of the segment. There are also but 4 groups of spinnerets, the anterior pair of which is composed of from 6 to 7, and the posterior pair from 3 to 4 pores. *The oval pores are large and distinct, forming two rows*, besides a few near the anterior end of the lateral margin.

*The North American Hymenopterous parasites of Coccidæ have been described as follows:—By Howard, 44; by Ashmead, 7; by Riley, 2; by Fitch, L. E. Baron, Emily A. Smith, Walker, Craw and Cook, 1 each; total, 59 species. There are a few others erroneously recorded as Coccid parasites, or only doubtfully parasitic on Coccidæ.

"Of *A. spinosus*, I examined 16 specimens, all of which agree with each other in every particular, while *A. Howardi* shows distinct and marked differences." (Oct. 29, 1894)

It will be seen from the above, that the credit of differentiating this new species is very largely due to Mr. Pergande. Although this beginning of our information concerning it is very inadequate, there will, I trust, be no further difficulty about its separation from its congeners, thanks to Mr. Pergande's excellent comparative studies. It is apparent from this and other similar instances, how great is the advantage of having the types preserved in some place where reference can be made to them. Descriptions are often imperfect, and even those by the best authors frequently omit some characters differentiating the species from others not at that time discovered.

[P. S.—I have just received the following information from Prof. Gillette regarding the occurrence of *Aspidiotus Howardi*:—"A very few scattering scales were found in one orchard at Cañon City—the owner of the orchard I do not know—and the others were all found on the fruit of a native plum tree. The tree was in the back door-yard of a Mr. Helm, and growing beside a tight board fence. Most of the scales were on plums next the fence and near the ground in the shade. Most of the fruits in that position had from one to three or four scales."—T. D. A. C.]

PRELIMINARY STUDIES IN SIPHONAPTERA.—I.

BY CARL P. BAKER, FORT COLLINS, COLO.

The following will form the first of a series of papers on the Siphonaptera, in which will be mentioned all known species, together with such new species as have come to my notice. Besides what has been drawn from the examination of a large series of specimens in my own collection, and many kindly sent me by Taschenberg, Howard, Bruner, Osborn, Comstock and others, I have borrowed freely from previous papers on the subject, and especially from Taschenberg's "Die Flohe."

The existing number of species of this order will undoubtedly be found to very greatly exceed the number already known. A large proportion of mammalian animals probably act as hosts to various species of fleas, but the list of hosts as at present known is comparatively very small indeed. The group, though certainly an interesting one, has been very much neglected. I would suggest that during the immediate future, collectors in all quarters pay particular attention to the collecting of these forms.

Order *Siphonaptera*, Latr.*

1798. Schellenberg, Helvetische Entom. I., p. 15. (Rophoteira.)
 1801. Lamarck, Syst. d. Anim. s. Vert., p. 313 (Aptera.)
 1805. Latreille, Hist. nat. des Crust. et des Insect. XIV. (Suctoria.)
 1825. Latreille, Fam. nat. du Regne Animal. (Siphonaptera.)
 1826. Kirby and Spence, Introd. to Entom. IV. (Aphaniptera.)
 1829. Stephens, Cat. Brit. Insect. (Pulicidæ.)

Wings entirely absent; mouth parts suctorial; maxillary palpi four-jointed;† labrum and clypeus wanting; eyes, when present, two in number and simple; antennæ three-jointed; tarsi five-jointed. Metamorphosis complete, larva footless, with a well-developed head.

Table of Families.

- Small fleas with a proportionally very large head; thoracic rings very narrow; pregnant female a stationary parasite, with abdomen worm-like or spherical; labial palpi one-jointed; third joint of antennæ without transverse incisions; no "combs" of spines on head, thorax, or abdomen; eyes present; species tropical or subtropical. . . . *Sarcopsyllidæ*.
 Larger fleas with a proportionally small head; thoracic rings broad; head, pronotum, or abdomen often with "combs" of spines; antennal grooves sometimes covered on the outside by a chitinous scale; antennæ with terminal joint transversely creased, or cleft into lamellæ on one side; eyes sometimes absent; species widely distributed.
 Labial palpi with more than ten joints; abdomen in pregnant female becoming so swollen as to lose its original shape. . . . *Vermipsyllidæ*.
 Labial palpi three to five-jointed; never a stationary parasite, and never with the abdomen so swollen that the original form is lost. . . *Pulicidæ*.

Fam. *Sarcopsyllidæ*, Tschb.

1880. Taschenberg, Die Flöhe, p. 43.

Table of Genera.

Head angulated above in front; maxillæ very small, scarcely projecting; abdomen of pregnant female spherical with sutures obsolete. *Sarcopsylla*.

* Rophoteira, in part; aptera, in part; suctoria, pre-occupied.

† Packard, in a late paper (Proc. Bost. Soc. Nat. Hist., XXVI., Sept., 1894, pp. 312-355), follows some of the old authors in calling the maxillary palpi five-jointed (l. c. p. 348). I cannot see the reason for reiterating statements that have been proven incorrect. In the near future, I will review those portions of this paper which seem to be original.

Head evenly rounded from occiput to mouth ; maxillæ large, curved, projecting downward and backward ; abdomen of pregnant female worm-like, sutures distinct. *Rhynchopsylla*.

Genus *Sarcopsylla*, Westwood.

1836-40. Westwood, Trans. Ent. Soc., London, II., p. 199.

Table of Species.

Hind angles of metathoracic scales rounded ; eyes and antennæ in anterior half of head, which is acutely angled in front above ; first four tarsal joints in foreleg longer than broad ; length (free female, and male), 1 mm. ; parasitic on mammals. *penetrans*.

Hind angles of metathoracic scales angulated ; eyes and antennæ in posterior half of head, which is obtusely angled in front above ; first four tarsal joints in forelegs nearly as broad as long ; length, 1-1.5 mm. ; parasitic on gallinaceous birds. *gallinacea*.

Sarcopsylla penetrans, L.

1767. Linne, Syst. Nat. Ed., XII., p. 1021. (*Pulex penetrans*.)

This flea is undoubtedly found throughout the tropical and sub-tropical regions of both hemispheres. It has been found on a great variety of mammalian animals, including man. It is commonly known in this country and South America as "jigger flea," "chigoe," or "chique."

Sarcopsylla gallinacea, Westwood.

1874-5. Westwood, Ent. Mo. Mag., XI., p. 246.

This species will probably eventually be found to occur throughout the range of *S. penetrans*. I have received specimens taken on chickens (through Mr. L. O. Howard) from the Department collection, as follows:—From Florida, Apr. 27, No. 6220, A. S. Packard ; from Floresville, Texas, No. 3648 ; from Hockley, Texas, Jan. 30, 1894, No. 3648 ; from Meridian, Miss., No. 4053.

The genital organs in the male of this species differ quite widely from those of the male of *S. penetrans*.

Sarcopsylla grossiventris, Weyenberg.

1879 Weyenberg, Boletín de la Acad. Nat. de Ciencias d. r. Repub. Argent., III., p. 188. (*Pulex grossiventris*.)

This is a *Sarcopsylla* and a good species, but was insufficiently described. The very large size (length of male, 2.5-3.25 mm.; of pregnant

female, 6-6.5 mm.) and the small metathoracic scale would separate it from *S. penetrans*. It was found on *Dasytus minutus*, Desm., and is probably restricted in range to southern South America, as nothing of the sort seems to have come to the notice of Bonnet.

Genus *Rhynchopsylla*, Haller.

1860. v. Frauenfeld, Sitzungsber. D. K. Akad. d. Wiss. Wien., XL., p. 462. (Hectopsylla.)

1880. Haller, Archiv. f. Naturgeschichte Jahrg. 46., p. 72. Taf. IV. (Rhynchopsylla.)

This genus contains but one species,

Rhynchopsylla pulex, Haller.

1860. v. Frauenfeld, Sitzungsber. D. K. Akad. d. Wiss., Wien., XL., p. 462. (Hectopsylla psittaci.)

1880. Haller, Archiv. f. Naturgeschichte Jahrg. 46., p. 72. Taf. IV. (Rhynchopsylla pulex.)

First mentioned by Frauenfeld, as taken from a species of *Psittacus*. Later was also found on a *Molossus*, sp.

Fam. *Vermipsyllidæ*, Wagner.

1889. Wagner, Horæ Soc. Ent. Ross. T., XXIII., No. 1-2, p. 205.

The family contains but one genus,

Genus *Vermipsylla*, Schimkewitsch.

1885. Schimkewitsch, Zool. Anz., No. 187.

Wagner (l. c.) characterizes this genus as follows:—Terminal antennal joint with nine circular incisions; mandibles double the length of maxillary palpi; labial palpi with 11 to 13 pseudo-joints; pregnant female with swollen abdomen. Parasitic on Ungulates.

Vermipsylla alacurt, Schimk.

1885. Schimkewitsch, Zool. Anz., No. 187. (Female.)

1889. Wagner, Horæ Soc. Ent. Ross. T., XXIII., No. 1-2, p. 205. (Male.)

(To be continued.)

BOOK NOTICE.

"Kritisches Verzeichniss der Myrmekophilen und Termitophilen Arthropoden mit Angabe der Lebensweise und mit Beschreibung neuer Arten. Von E. Wasmann, S. J., Berlin, Felix L. Dames, 1894."

Under the above title, Dr. Wasmann has given us the greatest contribution to this interesting subject ever made, and one that must become a classic in Entomology. The work is published in the form of an octavo brochure of some 248 pages, and is gotten up in a fine style of the printer's art.

A few pages of introduction preface the main body of the work, giving a short history of the study of myrmecophiles and termitophiles, and stating the difficulties arising in the study of the matter and lying in the way of the preparation of such a Catalogue as the present. The number of accidental or transient visitors to the nests of ants and termites is very large, and has formed a considerable proportion of several previous lists, but the Doctor has eliminated this element from his paper so far as possible. This introduction is followed by a tabular statement of the number of myrmecophilous and termitophilous arthropoda mentioned in the body of the work, from which we make the following extracts:—

The entire number of myrmecophilous insects reaches 1,177 species, of which 993 are Coleoptera, under which the family Staphylinidae is best represented with 263 species; the Paussidae (none of which are North American) follow next with 169, then the Histeridae with 128, the Pselaphidae (s.s.) with 113, and the Clavigeridae with 89. Several others hold from 15 to 40 species each of myrmecophilous habit, and in all 30 families are enumerated in this order. The Paussidae and Clavigeridae are, so far as known, almost exclusively myrmecophilous.

The Strepsiptera are represented by a single species of myrmecolax (*M. nietneri*, Westw.), which occurs in the hind body of ants in Ceylon. The Hymenoptera are found in 39 cases, of which 22 are other ants, and 14 belong to the parasitic families Braconidae, Chalcididae and Proctotrupidae. There are 26 species of Lepidoptera, 18 Diptera, 7 Orthoptera, 1 Pseudoneuropter, 72 Rhynchota and 20 Thysanura. The Myriapoda are doubtful or more likely inimical and accidental. There are also 26 myrmecophilous spiders, 34 Acarina and 9 Isopodous Crustacea.

So much for myrmecophiles. The termites do not support such a large list of species, as 105 kinds of insects only are here recognized as

termitophilous. Of these, 87 are Coleoptera, distributed by families as follows:—Carabidæ, 5; Staphylinidæ, 59; Pselaphidæ, 5; Silphidæ, 1; Lathridiidæ, 1; Histeridæ, 7; Scarabæidæ, 6. The other orders of insects are not so well represented as the beetles, numbering thus:—Hymenoptera, 6; Lepidoptera, 2; Diptera, 2 (doubtful); Pseudoneuroptera, 4; Rhynchota, 3; Thysanura, 1. The Arachnoidea are present with 4 species.

After this presentation of the standing of different groups comes a bibliography of over 550 titles of books and papers containing more or less extensive notices of the inhabitants of ants' and termites' nests, and this is again succeeded by a list of species classified on a double system. Each family is taken up in order, and the species contained in it are arranged under different heads, as myrmecophilous or termitophilous. When the name of the host is known it is given, together with a reference to the source of information, and the author has inserted notes wherever they seemed necessary for the elucidation of difficult or disputed points. The list occupies nearly 150 pages, and is a marvel of careful study and long research.

Next in order is a supplement of 19 pages, containing descriptions of new species of these interesting little insects—among them several from the collections of Messrs. Schwarz and Pergande, who have done so much to advance our knowledge of North American forms. The work is closed by an alphabetical index, which admits of instant reference to any family or genus mentioned in the body of the book.

In conclusion, we must offer to Dr. Wasmann our sincere thanks and hearty congratulations on the completion of this comprehensive and valuable contribution to entomological literature.

H. F. W.

DILIGENCE REWARDED.

Ever since Mr. Elliott disclosed the fact that *Platysamia Columbia* was to be found in this locality, a sharp lookout has been kept by the collectors here on the Tamarack trees, of which there are several clusters in this vicinity, for cocoons of that moth.

In the early part of December, 1894, Messrs. Balkwill and Rennie made the much looked for discovery, and in a short time had secured twelve, and on their next visit to the same locality, nine more; whilst they saw several that were well out of reach. They report them to be generally situated high up in the trees. On the smaller trees they are attached upright to the trunk, whilst on the larger ones, some were found on the branches, and seldom more than one on a tree. This is a good illustration of the advantage derived from knowing what to look for, and where to look for it, as they are far from being conspicuous objects.

J. ALSTON MOFFAT, London, Ont.

Mailed January 8th.

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